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(54) Title: SYNERGISTIC PESTICIDAL COMPOSITIONS COMPRISING N-CYANOMETHYL-4-(TRIFLUOROMETHYL)NICOTINAMIDE

(57) Abstract: Described are compositions for controlling insects or representatives of the order Acarina comprising a combination of variable quantities of one or more compounds of the formula (A) in free form or in salt form, if appropriate tautomers, in free form or in salt form, and one or more of the compounds, such as, for example: abamectin; azamethiphos; bromopropylate; chlorfenvinphos; cypermethrin, cypermethrin high-cis; cyromazin; diafenthiuron; diazinon; dicrotophos; dicyclanil; emamectin; fenoxycarb; lufenuron; methidathion; monocrotophos; profenofos; pymetrozine; tau-fluvalinate; thiamethoxam; azoxystrobin; bensultap; chlorothalonil; fenpyroximate; fluazinam; flufenprox; flutriafol; lambda-cyhalothrin; phosmet; picoxystrobin; primicarb; pyridaben; or tefluthrin; a process of controlling pests, a process for the preparation of the composition, its use and plant propagation material treated with it, and the use of the compound of the formula (A) for preparing the composition.

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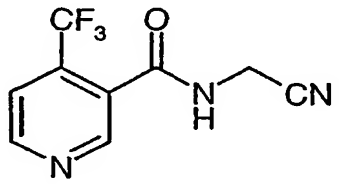
SYNERGISTIC PESTICIDAL COMPOSITIONS COMPRISING N-CYANOMETHYL-4-(TRIFLUOROMETHYL) NICOTINAMIDE

The present invention relates to a composition comprising an insecticidally and acaricidally active substance and at least one further pesticidally active substance and which is suitable for the simultaneous control of pests, in particular of insects, representatives of the order Acarina, of microorganisms and of phytopathogenic nematodes, for example on plants, to a process of controlling these pests, to a process for the preparation of the composition in question, and to its use.

Certain mixtures of active ingredients for controlling pests are described in the literature. The biological properties of these known mixtures are not fully satisfactory in the field of pest control, and there therefore is a need to provide further mixtures, especially mixtures with synergistic properties, for example with synergistic pesticidal properties, in particular for controlling insects and representatives of the order Acarina and of microorganisms. This object is achieved in accordance with the invention by providing the present composition.

Accordingly, the invention provides a composition for controlling pests, which comprises a combination of variable quantities of the compound of the formula



(A)

in free form or in salt form, if appropriate tautomers, in free form or in salt form, and one or more of the compounds:

(I) abamectin (mixture of avermectin B_{1a} and avermectin B_{1b});

(II) azamethiphos;

(III) a substance obtainable from Bacillus thuringiensis strain GC91 or from NCTC11821;

(IV) bromopropylate;

(V) chlorfenvinphos;

(VI) cypermethrin,cypermethrin high-cis;

(VII) cyromazin;

(VIII) diafenthiuron;

(IX) diazinon;

(X) dichlorvos;

(XI) dicrotophos;

(XII) dicyclanil;

(XIII) diofenolan;

(XIV) disulfoton;

(XV) emamectin-benzoate;

(XVI) fenoxycarb;

(XVII) fluazuron;

(XVIII) furathiocarb;
(XIX) isazofos;
(XX) jodfenphos;
(XXI) kinoprene;
(XXII) lufenuron;
(XXIII) methacriphos;
(XXIV) methidathion;
(XXV) methoprene;
(XXVI) monocrotophos;
(XXVII) phosphamidon;
(XXVIII) profenofos;
(XXIX) pymetrozine;
(XXX) quinalphos;
(XXXI) tau-fluvalinate;
(XXXII) thiamethoxam;
(XXXIII) thiocyclam;
(XXXIV) thiometon;
(XXXV) ZA 3274;
(XXXVI) azoxystrobin;
(XXXVII) bensultap;
(XXXVIII) bupirimate;
(XXXIX) chlorothalonil;
(XL) fenpyroximate;
(XLI) fluazinam;
(XLII) flufenprox;
(XLIII) flutriafol;
(XLIV) fosthiazate;
(XLV) hexaconazole;
(XLVI) lambda-cyhalothrin;
(XLVII) nematorin;
(XLVIII) phosmet;
(XLIX) picoxystrobin;
(L) primicarb;
(LI) pyridaben;
(LII) tefluthrin;
(LIII) chlorfenapyr;
(LIV) acephate;
(LV) acrinathrin;
(LVI) AKD-1022;
(LVII) alanycarb;
(LVIII) alphamethrin;
(LIX) amitraz;
(LX) AZ 60541;
(LXI) azinphos A;
(LXII) azinphos M;
(LXIII) azocyclotin;
(LXIV) aldicarb;
(LXV) azinphos-methyl;
(LXVI) benfuracarb;
(LXVII) bifenthrin;
(LXVIII) buprofezin;
(LXIX) bendiocarb;
(LXX) betacyfluthrin;
(LXXI) BPMC;
(LXXII) brofenprox;
(LXXIII) bromophos A;
(LXXIV) bufencarb;
(LXXV) butocarboxim;
(LXXVI) butylpyridaben;
(LXXVII) carbofuran;
(LXXVIII) cartap;
(LXXIX) chlorfluazuron;
(LXXX) chlorpyrifos;
(LXXXI) clothianidin;
(LXXXII) cyfluthrin;
(LXXXIII) alpha-cypermethrin;
(LXXXIV) zeta-cypermethrin;
(LXXXV) cadusafos;

(LXXXVI) carbaryl;
(LXXXVII) carbophenothion;
(LXXXVIII) chloethocarb;
(LXXXIX) chlorethoxyfos;
(XC) chlormephos;
(XCI) cis-resmethrin;
(XCII) clocythrin;
(XCIII) clofentezin;
(XCIV) cyanophos;
(XCV) cycloprothrin;
(XCVI) cyhexatin;
(XCVII) deltamethrin;
(XCVIII) diflubenzuron;
(XCIX) dinotefuran (MTI-446)
(C) demeton M;
(CI) demeton S;
(CII) demeton-S-methyl;
(CIII) dichlofenthion;
(CIV) dicliphos;
(CV) diethion;
(CVI) dimethoate;
(CVII) dimethylvinphos;
(CVIII) dibutylaminothio;
(CIX) dioxathion;
(CX) endosulfan;
(CXI) ethiofencarb;
(CXII) edifenphos;
(CXIII) esfenvalerate;
(CXIV) ethion;
(CXV) ethofenprox;
(CXVI) ethoprophos;
(CXVII) etrimphos;
(CXVIII) fenitrothion;
(CXIX) fenobucarb;
(CXX) fenvalerate;
(CXXI) fipronil;
(CXXII) formothion;
(CXXIII) fenamiphos;
(CXXIV) fenazaquin;
(CXXV) fenbutatin oxide;
(CXXVI) fenothiocarb;
(CXXVII) fenpropathrin;
(CXXVIII) fenpyrad;
(CXXIX) fenthion;
(CXXX) flucycloxuron;
(CXXXI) flucythrinate;
(CXXXII) flufenoxuron;
(CXXXIII) fonophos;
(CXXXIV) fubfenprox;
(CXXXV) methiocarb;
(CXXXVI) heptenophos;
(CXXXVII) HCH;
(CXXXVIII) hexaflumuron;
(CXXXIX) hexythiazox;
(CXL) imidacloprid;
(CXLI) isoprocarb;
(CXLII) iprobenfos;
(CXLIII) isofenphos;
(CXLIV) isoxathion;
(CXLV) ivermectin;
(CXLVI) methamidophos;
(CXLVII) methomyl;
(CXLVIII) mevinphos;
(CXLIX) malathion;
(CL) mecarbam;
(CLI) mesulfenphos;
(CLII) metaldehyde;
(CLIII) metolcarb;

(CLIV) milbemectin;
(CLV) moxidectin;
(CLVI) naled;
(CLVII) NC 184;
(CLVIII) nitenpyram;
(CLIX) acetamiprid;
(CLX) omethoate;
(CLXI) oxamyl;
(CLXII) oxydemethon M;
(CLXIII) oxydeprofos;
(CLXIV) permethrin;
(CLXV) phenthoate;
(CLXVI) phorate;
(CLXVII) phoxim;
(CLXVIII) pirimiphos-methyl;
(CLXIX) pirimiphos-ethyl;
(CLXX) promecarb;
(CLXXI) propaphos;
(CLXXII) prothiofos;
(CLXXIII) prothoate;
(CLXXIV) pyrachlophos;
(CLXXV) pyridaphenthion;
(CLXXVI) pyresmethrin;
(CLXXVII) pyrethrum;
(CLXXVIII) parathion;
(CLXXIX) parathion-methyl;
(CLXXX) phosalone;
(CLXXXI) pirimicarb;
(CLXXXII) propoxur;
(CLXXXIII) pyriproxyfen;
(CLXXXIV) pyrimidifen;
(CLXXXV) tebufenozide;
(CLXXXVI) teflubenzuron;
(CLXXXVII) terbufos;
(CLXXXVIII) triazamate;
(CLXXXIX) fenobucarb;
(CXC) tebufenozide;
(CXCI) beta-cyfluthrin;
(CXCII) silafluofen;
(CXCIII) salithion;
(CXCIV) sebufos;
(CXCV) spinosad;
(CXCVI) sulfotep;
(CXCVII) sulprofos;
(CXCVIII) tebufenpyrad;
(CXCIX) tebupirimphos;
(CC) temephos;
(CCI) terbam;
(CCII) tetrachlorvinphos;
(CCIII) thiafenox;
(CCIV) thiacloprid;
(CCV) thiodicarb;
(CCVI) thiofanox;
(CCVII) thionazin;
(CCVIII) thuringiensin;
(CCIX) tralomethrin;
(CCX) triarathene;
(CCXI) triazophos;
(CCXII) triazuron;
(CCXIII) trichlorfon;
(CCXIV) triflumuron;
(CCXV) trimethacarb;
(CCXVI) vamidothion;
(CCXVII) xylylcarb;
(CCXVIII) YI 5301/5302;
(CCXIX) zetamethrin;
(CCXX) indoxacarb;
(CCXXI) methoxyfenozide;

(CCXXII) bifenazate;
(CCXXIII) XMC (3,5-xylyl methylcarbamate);
(CCXXIV) an insect-active plant extract;
(CCXXV) a preparation comprising insect-active nematodes;
(CCXXVI) a preparation obtainable from Bacillus subtilis;
(CCXXVII) a preparation comprising insect-active fungi;
(CCXXVIII) a preparation comprising insect-active viruses;
(CCXXIX) bitertanol;
(CCXXX) cyproconazole;
(CCXXXI) cyprodinil;
(CCXXXII) difenoconazole;
(CCXXXIII) diniconazole;
(CCXXXIV) epoxiconazole;
(CCXXXV) fenpiclonil;
(CCXXXVI) fludioxonil;
(CCXXXVII) fluquiconazole;
(CCXXXVIII) flusilazole;
(CCXXXIX) flutriafol;
(CCXL) furalaxyl;
(CCXLI) hymexazol;
(CCXLII) imazalil;
(CCXLIII) imibenconazole:
(CCXLIV) ipconazole;
(CCXLV) metalaxyl;
(CCXLVI) R-metalaxyl;
(CCXLVII) metconazole;
(CCXLVIII) pefurazoate;
(CCXLIX) penconazole;
(CCL) prochloraz;
(CCLI) propiconazole;
(CCLII) SSF-109;
(CCLIII) tebuconazole;
(CCLIV) triazoxide;
(CCLV) triadimefon;
(CCLVI) triadimenol;
(CCLVII) triflumizole;
(CCLVIII) triticonazole; or
(CCLIX) uniconazole;

and at least one auxiliary.

The compound of the formula (A, IKI-220), N-Cyanomethyl-4-trifluoromethyl-3-pyridine carboxamide, is disclosed in EPA-580'374.

Compounds (I) to (CCLIX) are known, for example, from The Pesticide Manual, The British Crop Protection Council, Twelfth Edition, 2000. For example, said Pesticide Manual mentions abamectin on page 3; azoxystrobin on page 54; cyprodinil on page 240; cyromazin on page 241; diafenthiuron on page 262; emamectin-benzoate on page 341; fenoxycarb on page 394; fenpiclonil on page 395; fipronil on page 413; imidacloprid on page 537; lufenuron on page 573; picoxystrobin on page 743; pirimicarb on page 748; pymetrozine on page 790; and thiamethoxam on page 896.

Compounds of the formula (A) can form acid addition salts. These are formed for example with strong inorganic acids such as mineral acids, for example perchloric acid, sulfuric acid, nitric acid, nitrose acid, a phosphorus acid or a hydrohalic acid, with strong organic carboxylic acids such as unsubstituted or substituted, for example halogen-substituted, C_1-C_4alkanecarboxylic acids, for example acetic acid, such as saturated or unsaturated dicarboxylic acids, for example oxalic acid, malonic aicd, succinic acid, maleic acid, fumaric acid or phthalic acid, such as hydroxycarboxylic acids, for example ascorbic acid, lactic acid, malic acid, tartaric acid or citric acid, or such as benzoic acid, or with organic sulfonic acids such as unsubstituted or substituted, for example halogen-substituted, C_1-C_4alkanesulfonic or arylsulfonic acids, for example methane- or p-toluenesulfonic acid. Furthermore, compounds of the formula (A) which have at least one acidic group can form salts with bases. Suitable salts with bases are, for example, metal salts such as alkali metal or alkaline earth metal salts, for example sodium salts, potassium salts or magnesium salts, or salts with ammonia or an organic amine, such as morpholin, piperidin, pyrrolidin, a mono-, di- or tri-lower-alkylamine, for example ethyl-, diethyl-, triethyl- or dimethylpropylamine, or a mono-, di- or trihydroxy-lower-alkylamine, for example mono-, di- or triethanolamine. Furthermore, suitable internal salts may be formed, if appropriate. Preferred for the purposes of the invention are agrochemically advantageous salts. In general, the free form is preferred.

Also preferred is a composition which, in addition to the compound of the formula (A), only comprises one further additional pesticidally active compound (I) to (CCLIX).

The active ingredient combination according to the invention preferably comprises the active ingredient of the formula (A) and one of the active ingredients (I) to (CCLIX) in a mixing ratio of 100:1 to 1:6000, in particular from 1:50 to 50:1, especially in a ratio of between 1:20 and 20:1, especially between 10:1 and 1:10, very particularly between 5:1 and 1:5, particularly preferably between 2:1 and 1:2, also preferably between 4:1 and 2:1, mainly in a ratio of 1:1, or 5:1, or 5:2, or 5:3, or 5:4, or 4:1, or 4:2, or 4:3, or 3:1, or 3:2, or 2:1, or 1:5, or 2:5, or 3:5, or 4:5, or 1:4, or 2:4, or 3:4, or 1:3, or 2:3, or 1:2, or, 1:600, or 1:300, or 1:150, or 1:35, or 2:35, or 4:35, or 1:75, or 2:75, or 4:75, or 1:6000, or 1:3000, or 1:1500, or 1:350, or 2:350, or 4:350, or 1:750, or 2:750, or 4:750. These ratios are understood as meaning ratios by weight, but also molar ratios.

Surprisingly, it has now been found that the combination of the active ingredient of the formula (A) or a salt thereof with one of the active ingredients (I) to (CCLIX) causes not only an additive complementation of the spectrum of action with regard to the pests to be controlled, which would have been expected in principle, but that it leads to a synergistic effect which extends the limits of action of the two preparations in two respects:

Firstly, the application rates of the compound of the formula (A) and of the individual compounds (I) to (CCLIX) are reduced while retaining the good activity. Secondly, a high degree of pest control is achieved with the combined mixture even where the two individual substances have become entirely ineffective in the range of unduly low application rates. This provides not only a substantially broader spectrum of controllable pest, but also improved user safety.

Besides the actual synergistic action with regard to the pesticidal activity, the compositions according to the invention additionally also exhibit further surprising advantages which, in a wider sense, can also be termed synergistic: thus, for example, pests can be controlled which are not, or insufficiently, controlled with individual compounds (A) and (I) to (CCLIX), and the compositions according to the invention are tolerated better by plants, that is to say, for example, show reduced phytotoxicity, than the individual compounds (A) and (I) to (CCLIX). Moreover, the insects can be controlled at various developmental stages, which was not always the case with the individual compounds (A) and (I) to (CCLIX), since these compounds can be used, for example, as adulticides only or as larvicides only against quite specific larval stages. Moreover, combinations of the compound (A) with certain compounds

(I) to (CCLIX) show a more favorable behavior upon grinding, mixing, storage and also spraying.

The compositions according to the invention are valuable preventatively and/or curatively in the field of pest control even at low use concentrations while showing advantageous tolerance by warm-blooded species, fish and plants, and have a very advantageous biocidal spectrum. The compositions according to the invention are active against all or individual developmental stages of normally sensitive, but also resistant, pests such as insects and representatives of the order Acarina, and phytopathogenic fungi. The insecticidal, acaricidal and fungicidal action of the compositions according to the invention can manifest itself directly, i.e. in a destruction of the pests, which occurs immediately or only after some time has elapsed, for example during ecdysis, or indirectly, for example in reduced ova deposition and/or hatching rate, the good action corresponding to a destruction rate (mortality) of at least 50 to 60%.

Examples of the abovementioned animal pests include:
from the order of Lepidoptera
Acleris spp., Adoxophyes spp., Aegeria spp., Agrotis spp., Alabama argillaceae, Amylois spp., Anticarsia gemmatalis, Archips spp., Argyrotaenia spp., Autographa spp., Busseola fusca, Cadra cautella, Carposina nipponensis, Chilo spp., Choristoneura spp., Clysia ambiguella, Cnaphalocrocis spp., Cnephasia spp., Cochylis spp., Coleophora spp., Crocidolomia binotalis, Cryptophlebia leucotreta, Cydia spp., Diatraea spp., Diparopsis castanea, Earias spp., Ephestia spp., Eucosma spp., Eupoecilia ambiguella, Euproctis spp., Euxoa spp., Grapholita spp., Hedya nubiferana, Heliothis spp., Hellula spp., Hyphantria cunea, Keiferia lycopersicella, Leucoptera scitella, Lithocollethis spp., Lobesia botrana, Lymantria spp., Lyonetia spp., Malacosoma spp., Mamestra brassicae, Manduca sexta, Operophtera spp., Ostrinia nubilalis, Pammene spp., Pandemis spp., Panolis flammea, Pectinophora gossypiella, Phthorimaea operculella, Pieris rapae, Pieris spp., Plutella xylostella, Prays spp., Scirpophaga spp., Sesamia spp., Sparganothis spp., Spodoptera spp., Synanthedon spp., Thaumetopoea spp., Tortrix spp., Trichoplusia ni and Yponomeuta spp.;
from the order of Coleoptera, for example,
Agriotes spp., Anthonomus spp., Atomaria linearis, Chaetocnema tibialis, Cosmopolites spp., Curculio spp., Dermestes spp., Diabrotica spp., Epilachna spp., Eremnus spp., Leptinotarsa decemlineata, Lissorhoptrus spp., Melolontha spp., Oryzaephilus spp., Otiorhynchus spp.,

Phlyctinus spp., Popillia spp., Psylliodes spp., Rhizopertha spp., Scarabeidae, Sitophilus spp., Sitotroga spp., Tenebrio spp., Tribolium spp. and Trogoderma spp.;
from the order of Orthoptera, for example,
Blatta spp., Blattella spp., Gryllotalpa spp., Leucophaea maderae, Locusta spp., Periplaneta spp. and Schistocerca spp.;
from the order of Isoptera, for example,
Reticulitermes spp.;
from the order of Psocoptera, for example,
Liposcelis spp.;
from the order of Anoplura, for example,
Haematopinus spp., Linognathus spp., Pediculus spp., Pemphigus spp. and Phylloxera spp.;
from the order of Mallophaga, for example,
Damalinea spp. and Trichodectes spp.;
from the order of Thysanoptera, for example,
Frankliniella spp., Hercinothrips spp., Taeniothrips spp., Thrips palmi, Thrips tabaci and Scirtothrips aurantii;
from the order of Heteroptera, for example,
Cimex spp., Distantiella theobroma, Dysdercus spp., Euchistus spp. Eurygaster spp. Leptocorisa spp., Nezara spp., Piesma spp., Rhodnius spp., Sahlbergella singularis, Scotinophara spp. and Triatoma spp.;
from the order of Homoptera, for example,
Aleurothrixus floccosus, Aleyrodes brassicae, Aonidiella spp., Aphididae, Aphis spp., Aspidiotus spp., Bemisia tabaci, Ceroplaster spp., Chrysomphalus aonidium, Chrysomphalus dictyospermi, Coccus hesperidum, Empoasca spp., Eriosoma lanigerum, Erythroneura spp., Gascardia spp., Laodelphax spp., Lecanium corni, Lepidosaphes spp., Macrosiphus spp., Myzus spp., Nephotettix spp., Nilaparvata spp., Paratoria spp., Pemphigus spp., Planococcus spp., Pseudaulacaspis spp., Pseudococcus spp., Psylla spp., Pulvinaria aethiopica, Quadraspidiotus spp., Rhopalosiphum spp., Saissetia spp., Scaphoideus spp., Schizaphis spp., Sitobion spp., Trialeurodes vaporariorum, Trioza erytreae and Unaspis citri;
from the order of Hymenoptera, for example,
Acromyrmex, Atta spp., Cephus spp., Diprion spp., Diprionidae, Gilpinia polytoma, Hoplocampa spp., Lasius spp., Monomorium pharaonis, Neodiprion spp., Solenopsis spp. and Vespa spp.;
from the order of Diptera, for example,

Aedes spp., Antherigona soccata, Bibio hortulanus, Calliphora erythrocephala, Ceratitis spp., Chrysomyia spp., Culex spp., Cuterebra spp., Dacus spp., Drosophila melanogaster, Fannia spp., Gastrophilus spp., Glossina spp., Hypoderma spp., Hyppobosca spp., Liriomyza spp., Lucilia spp., Melanagromyza spp., Musca spp., Oestrus spp., Orseolia spp., Oscinella frit, Pegomyia hyoscyami, Phorbia spp., Rhagoletis pomonella, Sciara spp., Stomoxys spp., Tabanus spp., Tannia spp. and Tipula spp.;
from the order of Siphonaptera, for example,
Ceratophyllus spp. and Xenopsylla cheopis;
from the order of Thysanura, for example,
Lepisma saccharina and
from the order of Acarina, for example,
Acarus siro, Aceria sheldoni, Aculus schlechtendali, Amblyomma spp., Argas spp., Boophilus spp., Brevipalpus spp., Bryobia praetiosa, Calipitrimerus spp., Chorioptes spp., Dermanyssus gallinae, Eotetranychus carpini, Eriophyes spp., Hyalomma spp., Ixodes spp., Olygonychus pratensis, Ornithodoros spp., Panonychus spp., Phyllocoptruta oleivora, Polyphagotarsonemus latus, Psoroptes spp., Rhipicephalus spp., Rhizoglyphus spp., Sarcoptes spp., Tarsonemus spp. and Tetranychus spp.;

from the class Nematoda, for example,

the families Filariidae and Setariidae~~, especially~~ and the genera Haemonchus, Trichostrongylus, Ostertagia, Nematodirus, Cooperia, Ascaris, Bunostumum, Oesophagostonum, Chabertia, Trichuris, especially Trichuris vulpis, Strongylus, Trichonema, Dictyocaulus, Capillaria, Strongyloides, Heterakis, Toxocara, especially Toxocara canis, Ascaridia, Oxyuris, Ancylostoma, especially Ancylostoma caninum, Uncinaria, Toxascaris and Parascaris; Dirofilaria, in particular Dirofilaria immitis (heart worm).

Examples of the abovementioned phytopathogenic fungi include:

from the class of the Fungi imperfecti, for example,
Botrytis spp., Pyricularia spp., Helminthosporium spp., Fusarium spp., Septoria spp., Cercospora spp. and Alternaria spp.;
from the class of the Basidiomycetes, for example,
Rhizoctonia spp., Hemileia spp. and Puccinia spp.;
from the class of the Ascomycetes, for example,
Venturia spp., Erysiphe spp., Podosphaera spp., Monilinia spp. and Uncinula spp.; and

from the class of the Oomycetes, for example,
Phytophthora spp., Pythium spp. and Plasmopara spp.

Pests of the abovementioned type which occur in particular on plants, especially on useful plants and ornamentals in agriculture, in horticulture and in woodland, or on parts of such plants, such as fruits, flowers, foliage, stems, tubers or roots, can be controlled, i.e. contained or destroyed, with the active ingredient mixtures according to the invention, the protection against these pests in some cases also extending to plant parts which are formed at a later point in time.

The pesticide mixture according to the invention can be used advantageously for controlling pests in cereals, such as maize or sorghum; in fruit, for example pome fruit, stone fruit and soft fruit, such as apples, pears, plums, peaches, almonds, cherries or berries, for example strawberries, raspberries and blackberries; in pulses such as beans, lentils, peas or soyabeans; in oil crops such as oilseed rape, mustard, poppies, olives, sunflowers, coconut, castor-oil plant, cacao or peanuts; in cucurbits such as squash, cucumbers or melons; in fiber crops such as cotton, flax, hemp or jute; in citrus fruits such as oranges, lemons, grapefruit or tangerines; in vegetables such as spinach, lettuce, asparagus, cabbages, carrots, onions, tomatoes, potatoes or capsicum; in Lauraceae such as avocado, Cinnamonium or camphor; or in tobacco, nuts, coffee, egg plants, sugar cane, tea, pepper, grapevines, hops, Musaceae, latex plants or ornamentals,
especially in maize, sorghum, pome and stone fruit, pulses, cucurbits, cotton, citrus fruit, vegetables, egg plants, grapevines, hops or ornamentals,
in particular in maize, sorghum, apples, pears, plums, peaches, beans, peas, soyabeans, olives, sunflowers, coconuts, cacao, peanuts, cucumbers, squash, citrus fruit, cabbages, tomatoes, potatoes, grapevines or cotton,
particularly preferably in grapevines, citrus fruit, apples, pears, tomatoes and cotton.

Further fields of application of the active ingredient mixtures according to the invention are the protection of stored products and stores and of materials and in the hygiene sector in particular the protection of domestic animals and livestock against pests of the abovementioned type.

Depending on the intended aims and the prevailing circumstances, the pesticides according to the invention take the form of emulsifiable concentrates, suspension concentrates, directly sprayable or dilutable solutions, spreadable pastes, dilute emulsions, sprayable powders,

soluble powders, dispersible powders, wettable powders, dusts, granules or encapsulations in polymeric materials comprising the compound of the formula (A) or a salt thereof and one of the further active ingredients (I) to (CCLIX) according to the invention.

In these compositions, the active ingredients are employed in pure form, for example the solid active ingredients in a specific particle size, or, preferably, together with - at least - one of the auxiliaries conventionally used in the art of formulation, such as extenders, for example solvents or solid carriers, or such as surface-active compounds (surfactants).

The following can be examples of suitable solvents: unhydrogenated or partially hydrogenated aromatic hydrocarbons, preferably the C_8 to C_{12} fractions of alkylbenzenes, such as xylene mixtures, alkylated naphthalenes or tetrahydronaphthalene, aliphatic or cycloaliphatic hydrocarbons such as paraffins or cyclohexane, alcohols such as ethanol, propanol or butanol, glycols and their ethers and esters, such as propylene glycol, dipropylene glycol ether, ethylene glycol or ethylene glycol monomethyl ether or ethylylene glycol monoethyl ether; ketones such as cyclohexanone, isophorone or diacetone alcohol, strongly polar solvents such as N-methylpyrrolid-2-one, dimethyl sulfoxide or N,N-dimethylformamide, water, unepoxidized or epoxidized vegetable oils such as unepoxidized or epoxidized rapeseed oil, castor oil, coconut oil or soya oil, and silicone oils.

Materials which are used as solid carriers, for example for dusts and dispersible powders are, as a rule, ground natural rocks such as calcite, talc, kaolin, montmorillonite or attapulgite. Finely divided silicas or finely divided absorbent polymers may also be added to improve the physical properties. Suitable granular adsorptive carriers are porous types, such as pumice, crushed bricks, sepiolite or bentonite, and suitable nonsorptive carrier materials are calcite or sand. In addition, a large number of granulated inorganic or organic materials can be used, in particular dolomite or comminuted plant residues.

Depending on the type of the active ingredient to be formulated, suitable surface-active compounds are nonionic, cationic and/or anionic surfactants or surfactant mixtures with good emulsifying, dispersing and wetting properties. The surfactants listed hereinbelow are only to be considered as examples; many more surfactants which are conventionally used in the art of formulation and which are suitable in accordance with the invention are described in the specialist literature.

Nonionic surfactants which are suitable are, mainly, polyglycol ether derivatives of aliphatic or cycloaliphatic alcohols, saturated or unsaturated fatty acids and alkylphenols which may comprise 3 to 30 glycol ether groups and 8 to 20 carbon atoms in the (aliphatic) hydrocarbon radical and 6 to 18 carbon atoms in the alkyl radical of the alkylphenols. Also suitable are water-soluble polyethylene oxide adducts with polypropylene glycol, ethylenediaminopolypropylene glycol and alkylpolypropylene glycol with 1 to 10 carbon atoms in the alkyl chain which are soluble in water and comprise 20 to 250 ethylene glycol ether groups and 10 to 100 propylene glycol ether groups. Usually, the compounds mentioned comprise 1 to 5 ethylene glycol units per propylene glycol unit. Examples which may be mentioned are nonylphenolpolyethoxyethanols, castor oil polyglycol ether, polypropylene/polyethylene oxide adducts, tributylphenoxypolyethoxyethanol, polyethylene glycol and octylphenoxypolyethoxyethanol. Also suitable are fatty acid esters of polyoxyethylene sorbitan, such as polyoxyethylene sorbitan trioleate.

The cationic surfactants usually take the form of quarternary ammonium salts which have, as substituent(s), at least one alkyl radical having 8 to 22 C atoms and, as further substituents, lower, unhalogenated or halogenated alkyl, benzyl or lower hydroxyalkyl radicals. The salts are preferably in the form of halides, methylsulfates or ethylsulfates. Examples are stearyltrimethylammonium chloride and benzyl-di(2-chloroethyl)ethylammonium bromide.

Suitable anionic surfactants are both water-soluble soaps and water-soluble synthetic surface-active compounds. Suitable soaps are the alkali metal salts, alkaline earth metal salts and unsubstituted or substituted ammonium salts of higher fatty acids (C_{10}-C_{22}), such as the sodium salts or potassium salts of oleic or stearic acid, or of natural fatty acid mixtures which can be obtained from, for example, coconut or tall oil; the fatty acid methyltaurides may furthermore be mentioned. However, synthetic surfactants, in particular fatty sulfonates, fatty sulfates, sulfonated benzimidazole derivatives or alkylarylsulfonates, are used more frequently. The fatty sulfonates and fatty sulfates are generally present in the form of alkali metal salts, alkaline earth metal salts or substituted or unsubstituted ammonium salts and generally have an alkyl radical with 8 to 22 carbon atoms, alkyl also including the alkyl moiety of acyl radicals, for example the sodium salt or calcium salt of lignosulfonic acid, of the dodecylsulfuric ester or of a fatty alcohol sulfate mixture prepared from natural fatty acids. This section also includes the salts of the sulfuric esters and sulfonic acids of fatty alcohol/ethylene oxide adducts. The sulfonated benzimidazole derivatives preferably have 2 sulfonic acid groups and a fatty acid radical with 8-22 carbon atoms.

Examples of alkylarylsulfonates are the sodium, calcium or triethanolammonium salts of dodecylbenzenesulfonic acid, of dibutylnaphthalenesulfonic acid or of a naphthalenesulfonic acid/formaldehyde condensate. Suitable phosphates, for example salts of the phosphoric ester of a p-nonylphenol-(4-14)-ethylene oxide adduct, or phospholipids, are furthermore also possible.

As a rule, the compositions comprise 0.1 to 99%, in particular 0.1 to 95%, of a mixture of the active ingredient of the formula (A) with one of the active ingredients (I) to (CCLIX), and 1 to 99.9%, in particular 5 to 99.9%, of - at least - one solid or liquid auxiliary, it being possible, as a rule, for surfactants to amount to 0 to 25%, in particular 0.1 to 20%, of the compositions (% means in each case percent by weight). While concentrated compositions are preferred as commercially available goods, the end user uses, as a rule, dilute compositions with substantially lower active ingredient concentrations. Preferred compositions have in particular the following composition (% = percent by weight):

Emulsifiable concentrates:

Active ingredient mixture:	1 to 90%, preferably 5 to 20%
Surfactant:	1 to 30%, preferably 10 to 20%
Solvent:	5 to 98%, preferably 70 to 85%

Dusts:

Active ingredient mixture:	0.1 to 10%, preferably 0.1 to 1%
Solid carrier:	99.9 to 90%, preferably 99.9 to 99%

Suspension concentrates:

Active ingredient mixture:	5 to 75%, preferably 10 to 50%
Water:	94 to 24%, preferably 88 to 30%
Surfactant:	1 to 40%, preferably 2 to 30%

Wettable powders:

Active ingredient mixture:	0.5 to 90%, preferably 1 to 80%
Surfactant:	0.5 to 20%, preferably 1 to 15%
Solid carrier:	5 to 99%, preferably 15 to 98%

Granules:

Active ingredient mixture:	0.5 to 30%, preferably 3 to 15%
Solid carrier:	99.5 to 70%, preferably 97 to 85%

The compositions according to the invention can also comprise further solid or liquid auxiliaries, such as stabilizers, for example epoxidized or unepoxidized vegetable oils (for example epoxidized coconut oil, rapeseed oil or soya oil), antifoams, for example silicone oil, preservatives, viscosity regulators, binders and/or tackifiers, or else fertilizers or other active ingredients for achieving specific effects, for example bactericides, fungicides, nematicides, molluscicides or herbicides.

The compositions according to the invention are prepared in the known fashion, in the absence of auxiliaries for example by grinding, sieving and/or compressing a solid active ingredient or active ingredient mixture, for example to achieve a particular particle size, and in the presence of at least one auxiliary for example by intimately mixing and/or grinding the active ingredient, or active ingredient mixture, with the auxiliary (the auxiliaries). The process for the preparation of the compositions is therefore a further subject of the invention.

The mixtures of a compound of the formula (A) with one or more of the compounds (I) to (CCLIX) are preferably employed together with the auxiliaries conventionally used in the art of formulation and are therefore processed in a known manner to give, for example, emulsifiable concentrates, directly sprayable or dilutable solutions, dilute emulsions, wettable powders, soluble powders, dusts, granules, or else encapsulations in, for example, polymeric substances. The application processes such as spraying, fogging, dusting, wetting, scattering or pouring and the type of composition are selected to suit the intended aims and the prevailing circumstances.

The application processes for the compositions, that is to say the processes of controlling pests of the abovementioned type, such as spraying, fogging, dusting, brushing on, (seed-) dressing, spreading or pouring, which are to be selected depending on the intended aims and the prevailing circumstances, and the use of the compositions for controlling pests of the abovementioned type are further subjects of the invention. Typical use concentrations are between 0.1 and 1000 ppm, preferably between 0.1 and 500 ppm, of active ingredient. The application rate can vary within wide ranges and depends on the consistency of the soil, the type of application (foliar; seed dressing; application into the seed furrow), the crop plant, the pest to be controlled, the climatic circumstances which prevail, and other factors which are

the result of type of application, application timing and target crop. The application rates per hectare are generally 1 to 2000 g of active ingredients per hectare, in particular 10 to 1000 g/ha, preferably 20 to 600 g/ha.

A preferred application process in the field of crop protection is the application to the foliage of the plants (foliar application), it being possible to adapt application frequency and application rate to the risk of infection by the pest in question. However, the active ingredients may also reach the plants via the root system (systemic action), by drenching the locus of the plants with a liquid composition or by introducing the active ingredients in solid form into the locus of the plants, for example into the soil, for example in the form of granules (soil application). In the case of paddy rice crops, such granules can be metered into the flooded paddy field.

The compositions according to the invention are also suitable for protecting plant propagation material, for example seed, such as fruits, tubers or kernels, or plant cuttings, against animal pests. The propagation material can be treated with the composition before planting, for example seed can be dressed before sowing. The active ingredients according to the invention can also be applied to seed kernels (coating), either by soaking the kernels in a liquid composition or by coating them with a solid composition. The composition can also be applied to the site of application of the propagation material, for example to the seed furrow at the time of sowing. These treatment processes for plant propagation material and the plant propagation material treated thus also form part of the subject matter of the invention.

The examples which follow illustrate the invention.

Formulation examples (% = percent by weight, active ingredient ratios = ratios by weight)

Example F1: Emulsion concentrates	a)	b)	c)
Active ingredient mixture [Compound (A):			
Compound (I) to (CCLIX) = 1 : 3]	25%	40%	50%
Calcium dodecylbenzenesulfonate	5%	8%	6%
Castor oil polyethylene glycol ether (36 mol of EO)	5%		
Tributylphenol polyethylene glycol ether (30 mol of EO)		12%	4%
Cyclohexanone		15%	20%
Xylene mixture	65%	25%	20%

EO denotes the degree of ethoxylation of castor oil or tributylphenol.
Emulsions of any desired concentration can be prepared from such concentrates by dilution with water.

Example F2: Solutions	a)	b)	c)	d)
Active ingredient mixture [Compound (A):				
Compound (I) to (CCLIX) = 1 : 10]	80%	10%	5%	95%
Ethylene glycol monomethyl ether		20%		
Polyethylene glycol molecular weight 400	-	70%		
N-methyl-2-pyrrolidone	20%	-		
Epoxidized coconut oil			1%	5%
Petroleum ether (boiling range 160-190°C)			94%	

The solutions are suitable for use in the form of microdrops.

Example F3: Granules	a)	b)	c)	d)
Active ingredient mixture [Compound (A):				
Compound (I) to (CCLIX) = 2 : 1]	5%	10%	8%	21%
Kaolin	94%		79%	54%
Finely divided silica	1%		13%	7%
Attapulgite		90%		18%

The active ingredients are dissolved together in dichloromethane, the solution is sprayed on to the carrier, and the solvent is subsequently evaporated in vacuo.

Example F4: Dusts	a)	b)
Active ingredient mixture [Compound (A):		
Compound (I) to (CCLIX) = 1 : 1]	2%	5%
Finely divided silica	1%	5%
Talc	97%	
Kaolin		90%

Ready-to-use dusts are obtained by intimately mixing the carriers with the active ingredients.

Example F5: Wettable powders	a)	b)	c)
Active ingredient mixture [Compound (A):			
Compound (I) to (CCLIX) = 1 : 7.5]	25%	50%	75%
Sodium lignosulfonate	5%	5%	
Sodium lauryl sulfate	3%		5%
Sodium diisobutylnaphthalenesulfonate		6%	10%
Octylphenol polyethylene glycol ether (7-8 mol of EO)		2%	-
Finely divided silica	5%	10%	10%
Kaolin	62%	27%	-

The active ingredients are mixed with the additives and ground thoroughly in a suitable mill. This gives wettable powders which can be diluted with water to give suspensions of any desired concentration.

Example F6: Emulsion concentrate	
Active ingredient mixture [Compound (A):	
Compound (I) to (CCLIX) = 1 : 20]	10%
Octylphenol polyethylene glycol ether (4-5 mol of EO)	3%
Calcium dodecylbenzenesulfonate	3%
Castor oil polyglycol ether (36 mol of EO)	4%
Cyclohexanone	30%
Xylene mixture	50%

Emulsions of any desired concentration can be prepared from this concentrate by dilution with water.

Example F7: Dusts	a)	b)
Active ingredient mixture (2 : 3)	5%	8%
Talc	95%	-
Kaolin		92%

Ready-to-use dusts are obtained by mixing the active ingredients with the carrier and grinding the mixture in a suitable mill.

Example F8: Extruder granules

Active ingredient mixture [Compound (A):	
Compound (I) to (CCLIX) = 1 : 4]	10%
Sodium lignosulfonate	2%
Carboxymethylcellulose	1%
Kaolin	87%

The active ingredients are mixed with the additives and the mixture is ground and moistened with water. This mixture is extruded, granulated and subsequently dried in a stream of air.

Example F9: Coated granules

Active ingredient mixture [Compound (A):	
Compound (I) to (CCLIX) = 1 : 10]	3%
Polyethylene glycol (molecular weight 200)	3%
Kaolin	94%

In a mixer, the finelyground active ingredients are applied uniformly to the kaolin which has been moistened with polyethylene glycol. This gives dust-free coated granules.

Example F10: Suspension concentrate

Active ingredient mixture (2 : 7)	40%
Ethylene glycol	10%
Nonylphenol polyethylene glycol ether (15 mol of EO)	6%
Sodium lignosulfonate	10%
Carboxymethylcellulose	1%
37% aqueous formaldehyde solution	0.2%
Silicone oil in the form of a 75% aqueous emulsion	0.8%
Water	32%

The finely ground active ingredients are mixed intimately with the additives. This gives a suspension concentrate from which suspensions of any desired concentration can be prepared by dilution with water.

Frequently, it is more practical to formulate the active ingredient of the formula (A) and one of the mixing components (I) to (CCLIX) singly and only to combine them in the water in the applicator in the desired mixing ratio as a "tank mix" shortly before application.

Biological examples (% = percent by weight unless otherwise specified)

A synergistic effect is present when the action We of the combination of an active ingredient of the formula (A) together with one of the active ingredients (I) to (CCLIX) exceeds the total of the action of the active ingredients applied individually:

$$We > X + Y \quad (B)$$

The expected pesticidal action We for a given combination of two pesticides can, however, also be calculated as follows (cf. COLBY, S.R., "Calculating synergistic and antagonstic response of herbicide combinations", Weeds 15, pages 20-22, 1967):

$$We = X + \frac{Y\,(100 - X)}{100} \quad (C)$$

where:

X = Percent mortality in the treatment with the compound of the formula (A) at an application rate of p kg per hectare compared with the untreated control (= 0%).

Y = Percent mortality in the treatment with the compound (I) to (CCLIX) at an application rate of q kg per hectare compared with the untreated control.

We = Expected pesticidal action (percent mortality compared with the untreated control) after treatment with the compound of the formula (A) and a compound (I) to (CCLIX) at an application rate of p + q kg of active ingredient per hectare.

An actually observed action which exceeds the expected We value indicates synergism.

Example B1: Action against Bemisia tabaci

Dwarf bean plants are placed into gauze cages and populated with Bemisia tabaci adults. After ova deposition has taken place, all the adults are removed. 10 days later, the plants together with the nymphs thereon are sprayed with an aqueous suspension spray mixture comprising 50 ppm of the active ingredient mixture. After a further 14 days, the hatching percentage of the eggs is evaluated in comparison with untreated controls.

In this experiment, the combinations of an active ingredient of the formula (A) with one of the active ingredients (I) to (CCLIX) show a synergistic effect. In particular, a suspension spray mixture comprising 45 ppm of the compound (A) and 5 ppm of the compound (I) is very effective.

Example B2: Action against Spodoptera littoralis caterpillars

Young soyabean plants are sprayed with an aqueous emulsion spray mixture comprising 360 ppm of the active ingredient mixture. After the spray coating has dried on, the soyabean plants are populated with 10 third-stage caterpillars of Spodoptera littoralis and placed into a plastic container. The experiment is evaluated 3 days later. The percentage reduction in population, or the percentage reduction in feeding damage, (% action) is determined by comparing the number of dead caterpillars and the feeding damage on the treated plants with those on the untreated plants.

In this experiment, the combinations of an active ingredient of the formula (A) with one of the active ingredients (I) to (CCLIX) show a synergistic effect. In particular, a suspension spray mixture comprising 350 ppm of compound (A) and 10 ppm of compound (XV) and a suspension spray mixture comprising 180 ppm of compound (A) and 180 ppm of compound (XXXII) are very effective.

Example B3: Ovicidal action against Lobesia botrana

Lobesia botrana eggs laid on filter paper are briefly immersed into a test solution in acetone/water comprising 400 ppm of the active ingredient mixture to be tested. After the test solution has dried on, the eggs are incubated in petri dishes. After 6 days, the hatching percentage of the eggs is evaluated in comparison with untreated controls (% hatching reduction).

In this experiment, the combinations of an active ingredient of the formula (A) with one of the active ingredients (I) to (CCLIX) show a synergistic effect. In particular, a suspension spray mixture comprising 300 ppm of compound (A) and 100 ppm of compound (XVI) and a suspension spray mixture comprising 200 ppm of compound (A) and 200 ppm of compound (XXII) are very effective.

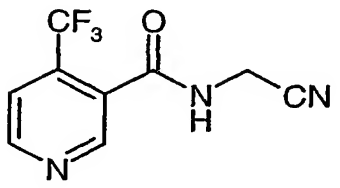
Example B4: Ovicidal action against Heliothis virescens

Heliothis virescens eggs laid on filter paper are briefly immersed into a test solution in acetone/water comprising 400 ppm of the active ingredient mixture to be tested. After the test solution has dried on, the eggs are incubated in petri dishes. After 6 days, the hatching percentage of the eggs is evaluated in comparison with untreated controls (% hatching reduction).

In this experiment, the combinations of an active ingredient of the formula (A) with one of the active ingredients (I) to (CCLIX) show a synergistic effect. In particular, a suspension spray mixture comprising 240 ppm of compound (A) and 160 ppm of compound (VIII) and a suspension spray mixture comprising 300 ppm of compound (A) and 100 ppm of compound (XXIX) are very effective.

WHAT IS CLAIMED IS:

1. A composition for controlling pests, which comprises a combination of variable quantities of the compound of the formula



(A)

in free form or in salt form, if appropriate tautomers, in free form or in salt form, and one or more of the compounds:

(I) abamectin (mixture of avermectin B_{1a} and avermectin B_{1b});
(II) azamethiphos;
(III) a substance obtainable from Bacillus thuringiensis strain GC91 or from NCTC11821;
(IV) bromopropylate;
(V) chlorfenvinphos;
(VI) cypermethrin,cypermethrin high-cis;
(VII) cyromazin;
(VIII) diafenthiuron;
(IX) diazinon;
(X) dichlorvos;
(XI) dicrotophos;
(XII) dicyclanil;
(XIII) diofenolan;
(XIV) disulfoton;
(XV) emamectin-benzoate;
(XVI) fenoxycarb;
(XVII) fluazuron;
(XVIII) furathiocarb;
(XIX) isazofos;
(XX) jodfenphos;
(XXI) kinoprene;
(XXII) lufenuron;
(XXIII) methacriphos;
(XXIV) methidathion;
(XXV) methoprene;
(XXVI) monocrotophos;
(XXVII) phosphamidon;
(XXVIII) profenofos;
(XXIX) pymetrozine;
(XXX) quinalphos;
(XXXI) tau-fluvalinate;
(XXXII) thiamethoxam;
(XXXIII) thiocyclam;
(XXXIV) thiometon;
(XXXV) ZA 3274;
(XXXVI) azoxystrobin;
(XXXVII) bensultap;
(XXXVIII) bupirimate;
(XXXIX) chlorothalonil;
(XL) fenpyroximate;
(XLI) fluazinam;

(XLII) flufenprox;
(XLIII) flutriafol;
(XLIV) fosthiazate;
(XLV) hexaconazole;
(XLVI) lambda-cyhalothrin;
(XLVII) nematorin;
(XLVIII) phosmet;
(XLIX) picoxystrobin;
(L) primicarb;
(LI) pyridaben;
(LII) tefluthrin;
(LIII) chlorfenapyr;
(LIV) acephate;
(LV) acrinathrin;
(LVI) AKD-1022;
(LVII) alanycarb;
(LVIII) alphamethrin;
(LIX) amitraz;
(LX) AZ 60541;
(LXI) azinphos A;
(LXII) azinphos M;
(LXIII) azocyclotin;
(LXIV) aldicarb;
(LXV) azinphos-methyl;
(LXVI) benfuracarb;
(LXVII) bifenthrin;
(LXVIII) buprofezin;
(LXIX) bendiocarb;
(LXX) betacyfluthrin;
(LXXI) BPMC;
(LXXII) brofenprox;
(LXXIII) bromophos A;
(LXXIV) bufencarb;
(LXXV) butocarboxim;
(LXXVI) butylpyridaben;
(LXXVII) carbofuran;
(LXXVIII) cartap;
(LXXIX) chlorfluazuron;
(LXXX) chlorpyrifos;
(LXXXI) clothianidin;
(LXXXII) cyfluthrin;
(LXXXIII) alpha-cypermethrin;
(LXXXIV) zeta-cypermethrin;
(LXXXV) cadusafos;
(LXXXVI) carbaryl;
(LXXXVII) carbophenothion;
(LXXXVIII) chloethocarb;
(LXXXIX) chlorethoxyfos;
(XC) chlormephos;
(XCI) cis-resmethrin;
(XCII) clocythrin;
(XCIII) clofentezin;
(XCIV) cyanophos;
(XCV) cycloprothrin;
(XCVI) cyhexatin;
(XCVII) deltamethrin;
(XCVIII) diflubenzuron;
(XCIX) dinotefuran (MTI-446)
(C) demeton M;
(CI) demeton S;
(CII) demeton-S-methyl;
(CIII) dichlofenthion;
(CIV) dicliphos;
(CV) diethion;
(CVI) dimethoate;
(CVII) dimethylvinphos;
(CVIII) dibutylaminothio;
(CIX) dioxathion;

(CX) endosulfan;
(CXI) ethiofencarb;
(CXII) edifenphos;
(CXIII) esfenvalerate;
(CXIV) ethion;
(CXV) ethofenprox;
(CXVI) ethoprophos;
(CXVII) etrimphos;
(CXVIII) fenitrothion;
(CXIX) fenobucarb;
(CXX) fenvalerate;
(CXXI) fipronil;
(CXXII) formothion;
(CXXIII) fenamiphos;
(CXXIV) fenazaquin;
(CXXV) fenbutatin oxide;
(CXXVI) fenothiocarb;
(CXXVII) fenpropathrin;
(CXXVIII) fenpyrad;
(CXXIX) fenthion;
(CXXX) flucycloxuron;
(CXXXI) flucythrinate;
(CXXXII) flufenoxuron;
(CXXXIII) fonophos;
(CXXXIV) fubfenprox;
(CXXXV) methiocarb;
(CXXXVI) heptenophos;
(CXXXVII) HCH;
(CXXXVIII) hexaflumuron;
(CXXXIX) hexythiazox;
(CXL) imidacloprid;
(CXLI) isoprocarb;
(CXLII) iprobenfos;
(CXLIII) isofenphos;
(CXLIV) isoxathion;
(CXLV) ivermectin;
(CXLVI) methamidophos;
(CXLVII) methomyl;
(CXLVIII) mevinphos;
(CXLIX) malathion;
(CL) mecarbam;
(CLI) mesulfenphos;
(CLII) metaldehyde;
(CLIII) metolcarb;
(CLIV) milbemectin;
(CLV) moxidectin;
(CLVI) naled;
(CLVII) NC 184;
(CLVIII) nitenpyram;
(CLIX) acetamiprid;
(CLX) omethoate;
(CLXI) oxamyl;
(CLXII) oxydemethon M;
(CLXIII) oxydeprofos;
(CLXIV) permethrin;
(CLXV) phenthoate;
(CLXVI) phorate;
(CLXVII) phoxim;
(CLXVIII) pirimiphos-methyl;
(CLXIX) pirimiphos-ethyl;
(CLXX) promecarb;
(CLXXI) propaphos;
(CLXXII) prothiofos;
(CLXXIII) prothoate;
(CLXXIV) pyrachlophos;
(CLXXV) pyridaphenthion;
(CLXXVI) pyresmethrin;
(CLXXVII) pyrethrum;

(CLXXVIII) parathion;
(CLXXIX) parathion-methyl;
(CLXXX) phosalone;
(CLXXXI) pirimicarb;
(CLXXXII) propoxur;
(CLXXXIII) pyriproxyfen;
(CLXXXIV) pyrimidifen;
(CLXXXV) tebufenozide;
(CLXXXVI) teflubenzuron;
(CLXXXVII) terbufos;
(CLXXXVIII) triazamate;
(CLXXXIX) fenobucarb;
(CXC) tebufenozide;
(CXCI) beta-cyfluthrin;
(CXCII) silafluofen;
(CXCIII) salithion;
(CXCIV) sebufos;
(CXCV) spinosad;
(CXCVI) sulfotep;
(CXCVII) sulprofos;
(CXCVIII) tebufenpyrad;
(CXCIX) tebupirimphos;
(CC) temephos;
(CCI) terbam;
(CCII) tetrachlorvinphos;
(CCIII) thiafenox;
(CCIV) thiacloprid;
(CCV) thiodicarb;
(CCVI) thiofanox;
(CCVII) thionazin;
(CCVIII) thuringiensin;
(CCIX) tralomethrin;
(CCX) triarathene;
(CCXI) triazophos;
(CCXII) triazuron;
(CCXIII) trichlorfon;
(CCXIV) triflumuron;
(CCXV) trimethacarb;
(CCXVI) vamidothion;
(CCXVII) xylylcarb;
(CCXVIII) YI 5301/5302;
(CCXIX) zetamethrin;
(CCXX) indoxacarb;
(CCXXI) methoxyfenozide;
(CCXXII) bifenazate;
(CCXXIII) XMC (3,5-xylyl methylcarbamate);
(CCXXIV) an insect-active plant extract;
(CCXXV) a preparation comprising insect-active nematodes;
(CCXXVI) a preparation obtainable from Bacillus subtilis;
(CCXXVII) a preparation comprising insect-active fungi;
(CCXXVIII) a preparation comprising insect-active viruses;
(CCXXIX) bitertanol;
(CCXXX) cyproconazole;
(CCXXXI) cyprodinil;
(CCXXXII) difenoconazole;
(CCXXXIII) diniconazole;
(CCXXXIV) epoxiconazole;
(CCXXXV) fenpiclonil;
(CCXXXVI) fludioxonil;
(CCXXXVII) fluquiconazole;
(CCXXXVIII) flusilazole;
(CCXXXIX) flutriafol;
(CCXL) furalaxyl;

(CCXLI) hymexazol;
(CCXLII) imazalil;
(CCXLIII) imibenconazole:
(CCXLIV) ipconazole;
(CCXLV) metalaxyl;
(CCXLVI) R-metalaxyl;
(CCXLVII) metconazole;
(CCXLVIII) pefurazoate;
(CCXLIX) penconazole;
(CCL) prochloraz;
(CCLI) propiconazole;
(CCLII) SSF-109;
(CCLIII) tebuconazole;
(CCLIV) triazoxide;
(CCLV) triadimefon;
(CCLVI) triadimenol;
(CCLVII) triflumizole;
(CCLVIII) triticonazole; or
(CCLIX) uniconazole;
and at least one auxiliary.

2. A composition according to claim 1, which comprises the compound of the formula (A) in free form.

3. A composition according to claim 1 or 2, which comprises only one of the compounds (I) to (CCLIX).

4. A process for controlling pests, wherein a composition as described in any of claims 1 to 3 is applied to the pests or their environment.

5. A process as claimed in claim 4 for protecting plant propagation material, wherein the propagation material or the site of application of the propagation material is treated.

6. A process for the preparation of a composition as described in any of claims 1 to 3, comprising at least one auxiliary, wherein the active ingredients are mixed intimately with the auxiliary (the auxiliaries).

7. Plant propagation material treated in accordance with the process described in claim 5.

8. Use of a composition as described in any of claims 1 to 3 in a process as described in claim 5 or 6.

INTERNATIONAL SEARCH REPORT

Int ial Application No
CT/EP 01/12947

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A01N43/40 //(A01N43/40,61:00)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 01 76369 A (ERDELEN CHRISTOPH ;BAYER AG (DE); FISCHER REINER (DE); BRETSCHNEID) 18 October 2001 (2001-10-18) page 1 -page 6	1-8
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A	EP 0 580 374 A (ISHIHARA SANGYO KAISHA) 26 January 1994 (1994-01-26) cited in the application the whole document	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 December 2001	21/12/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Bertrand, F

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

[redacted]tion on patent family members

[redacted]al Application No
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